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5th Driving wheel

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Preface

We are delighted that you have chosen a product from LINAK®.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, electric control boxes, controls and chargers.

This User Manual will tell you how to install, use and maintain your LINAK equipment.

We are sure that your LINAK system will give you many years of problem-free operation. Before our products leave the factory they undergo full function and quality testing. Should you nevertheless experience problems with your systems, you are always welcome to contact your local dealer.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you.

LINAK provides a warranty on all its products. This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK systems can affect their operation and durability. The products are not to be opened by unauthorised personnel. The User Manual has been written on the basis of our present technical knowledge. We are constantly working on updating the information and we therefore reserve the right to carry out technical modifications.

LINAK A/S

Important information

For further information regarding Warnings and Recommandations, please read the user manual Actuators and Electronics on our website *www.linak.com*.

The 5th Driving wheel system consists of the following products.

Driving wheel *(see page 7):*
- in partnership with TENTE (Driving wheel must be ordered from Tente)

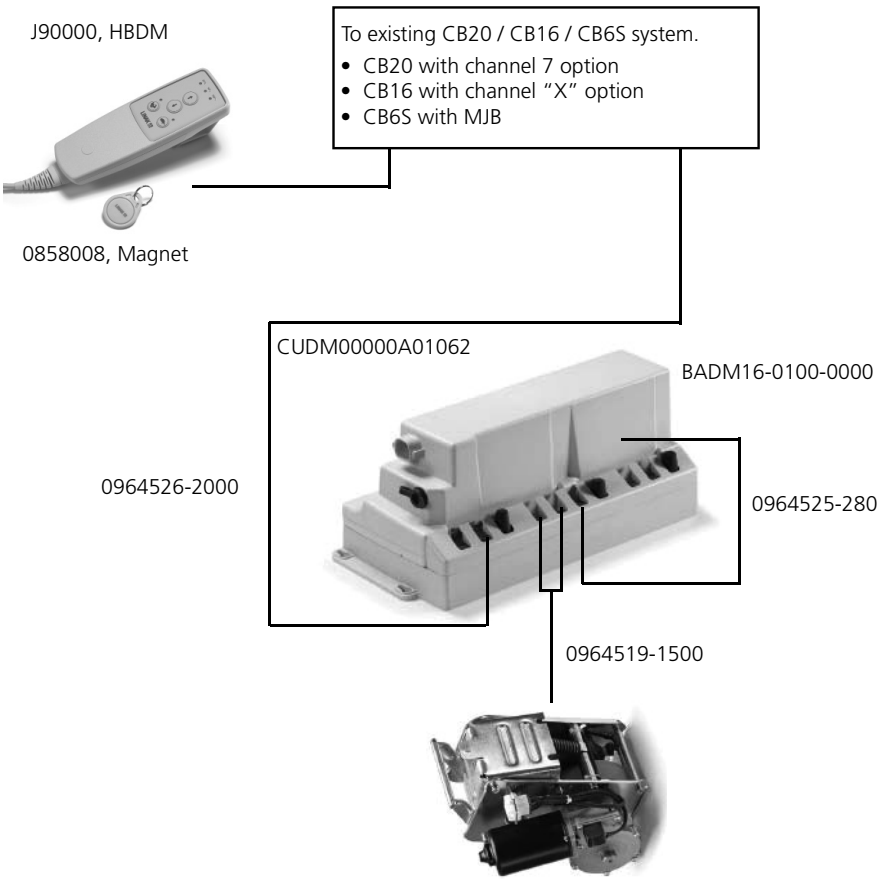
Control Unit *(see page 12):*
- CUDM
- Compatible with CB16, CB20 and CB6S control boxes and LINAK controls

Battery *(see page 14):*
- BADM 2.9 Ah

Control handset *(see page 15):*
- Special handset
- Special activation key
- Compatible with CB16, CB20 and CB6S control boxes

Usage:
- Compatibility: CB16, CB20 and CB6S (longer charging time)
- Duty cycle: Continuous use (on fully charged battery)
- Usage temperature: 5°C to 40°C
- Relative humidity: 20% to 80% at 30°C
- Storage temperature: -10°C to 50°C
- Atmospheric pressure: 700 to 1060 hPa
- Approvals: Pending

System diagram



Do not use spare OpenBus™ ports on CUDM for other purposes, insert ***"blind plugs"***.

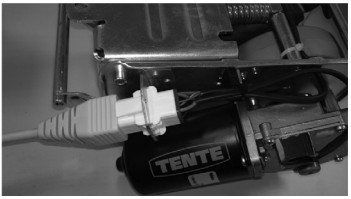
Assembly procedure:
Must be followed in order to secure no potential power errors

- No mains connected!
- Mount cable on the wheel
- Mount wheel cable in CUDM yellow ring to the left side (ch.1), green to the right side (ch.2) as shown on next pages
- Mount CUDM battery cable
- Connect CUDM to power from CU20, channel 7
- Connect HBDM to existing OpenBus™ system
- Connect to mains and charge to 100%

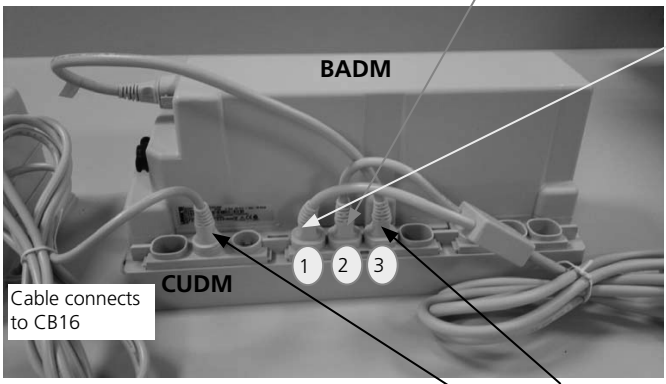
Connection of the 5th Driving wheel (CB16)

Important: Connections of the components in the wrong sequence may damage the equipment. Please follow the instructions strictly. As the system is powered by battery it can be unintentionally powered up and create hot-plugging!

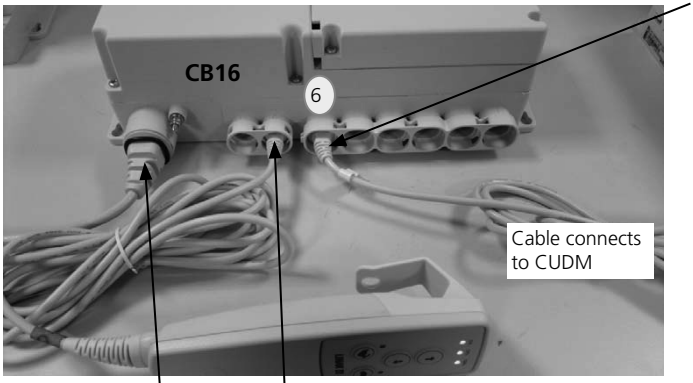
STEP 1. Make sure that the CB16 is NOT connected to mains.
STEP 2. Connect cable 0964519 to the wheel, see below.



STEP 3. Connect cable 0964519 to the CUDM. The connector with yellow O-ring in port "Out 1" and the connector with green O-ring in port "Out 2".



STEP 4. Connect cable 0964525 between BADM and CUDM port "Out 3".
STEP 5. Connect cable 0964526 to CUDM port "In1" and CB16 port "6".

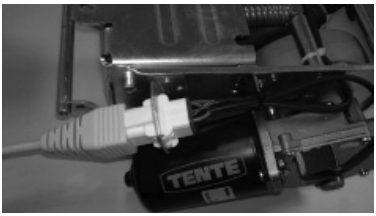


STEP 6. Connect HBDM to CB16 "A".
STEP 7. Connect mains cable.
STEP 8. Insert blind plugs in unused CUDM connector ports, and fasten cable locks on CUDM and CB16.
STEP 9. Before use, charge the system for at least 1 hour.

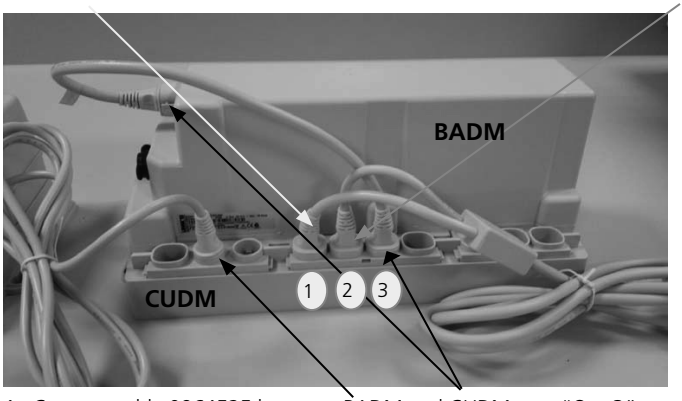
Connection of the 5th Driving wheel (CB20)

Important: Connections of the components in the wrong sequence may damage the equipment. Please follow the instruction strictly.

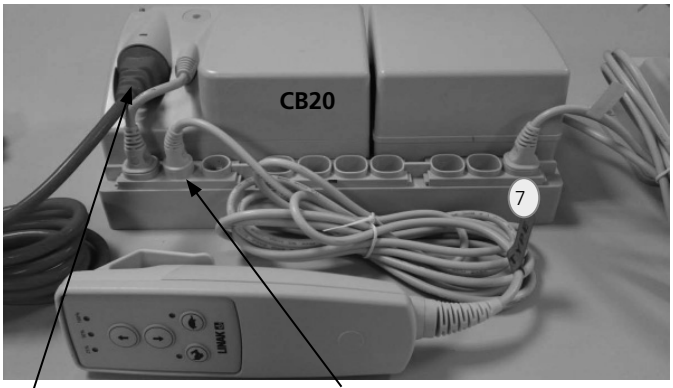
1. Make sure that the CB20 is NOT connected to mains.
2. Connect cable 0964519 to the wheel.



3. Connect cable 0964519 to the CUDM. The connector with yellow O-ring in port "Out 1" and the connector with green O-ring in port "Out 2".



4. Connect cable 0964525 between BADM and CUDM port "Out 3".
5. Connect cable 0964526 to CUDM port "In1" and CU20 port "Out 7".



6. Connect HBDM to CU20 "In 1".
7. Connect mains cable.
8. Insert blind plugs in unused connectors, and "click" cable locks on CUDM and CB20.
9. Before use, charge the system for at least 1 hour.

Connection of the 5th Driving wheel (CB6S)

Important: Connection of the components in the wrong sequence may damage the equipment.
Please follow the instructions strictly.

If CB6S is used, the charging will take place via the normal OpenBus™ connection. a standard cable W.RO45 (6 wires modular Jack) with plugs in both ends is connected to CB6S via a MJB.

Follow steps 1 to 4 in the previous descriptions.

Disconnection of the 5th Driving wheel

1. If not connected to mains, connect the system to mains, for at least 10 seconds.
2. Disconnect mains and remove mains cable. Wait at least 30 seconds.
3. Remove cable between CUDM and CU20.
4. Disconnect HBDM.
5. Remove cable between wheel and CUDM.
6. Remove cable between Battery and CUDM.

Connection of IB30/service tool

Important: Connection of the components in the wrong sequence may damage the equipment.
Please follow the instructions strictly.

1. If not connected to mains, connect the system to mains, for at least 10 seconds.
2. Disconnect mains, and wait at least 30 seconds.
3. Connect the IB30 to CU20 port "In 2".
4. Connect to mains.
5. Connect the IB30 to the PC (USB cable)

Disconnection of IB30/service tool

Important: Disconnection of the components in the wrong sequence may damage the equipment.
Please follow the instructions strictly.

1. Remove the USB cable from the PC and IB30.
2. Disconnect the IB30 from CU20 port "In 2".

Explanation:

Battery level:
When the bed is connected to mains the battery indicators will be lit. When the batteries are fully charged all 3 battery indicators will be lit, (in cases where the 25% indicator is lit the bed should be charged). As the batteries are being discharged the indicators will gradually turn off.

Arrow Up: Drive Forward

Arrow Down: Drive backwards

Hare: Drive fast. When this function is chosen it's indicator will be lit.

Turtle: Drive slow. The system is set up in such a way, that it always starts driving slowly. The turtle indicator will therefore always be lit at start up.

Activation button: For activation of the panel, touch the raised area lowest on the handset with the magnet shown in the photo below.

It is recommended to test the Drive Me system before driving with a patient.

INSTRUCTIONS:
1. Activate panel with magnet. LED above Turtle will illuminate.
2. Choose other speed if desired.
3. Activate by the use of arrow buttons for desired driving direction.
4. After the transportation is completed the bed must be connected to mains for battery charging.

Be aware of:
1. Wheel lowers automatically and starts driving at once, when an arrow button is activated (only if the panel has been activated).
2. Wheel raises automatically approx. 5 seconds after end of driving.
3. The panel will be active for approx. 10 seconds after the wheel has been raised, after which all indicators will turn off.
4. During connection of mains the panel cannot be activated and drive functions are therefore not available.
5. Do not move the bed from side to side before the wheel has been raised from the floor.

Troubleshooting / Instruction.

ERROR MODE

LED signal	Trigger	Error Mode	Do the following
The two speed LEDs flashing at fast flashing rate for 3 seconds	Activation of Enable by Magnet™ sensor when connected to mains	Drive lockout	Remove connection from mains and retry
The two speed LEDs flashing at fast flashing rate	Activation of both direction keys	HBDM Key Error	Wait until EBM* is disabled. If error is not removed then check HBDM keys.
The two speed LEDs flashing at slow flashing rate	HBDM keeps Enable by Magnet™ active for longer than **Enable by Magnet time out + 5**	HBDM Enable by Magnet™ Timer Error	Wait until EBM* is disabled. If error is not removed then check HBDM.
All three battery indicators flashing: 25% and 100% at slow flashing rate, 50% at fast flashing rate	Charger has detected overload condition	Stopped, Overload (not charging)	Disconnect mains, check battery connections. Connect to mains until charged.
	VPermanent has been lower than 34V for more than 30 seconds	Stopped, Low VPermanent (not charging)	Remove load. Stop movements of application. Reconnect mains.
All three battery indicators flashing at slow flashing rate	Mains not detected (mains bit not active for 10 frames in a row)	Stopped, Mains not detected (not charging)	Remove mains, wait 10 sec. and reconnect.

**EBM means Enable by Magnet*

Buzzer signal	Trigger	Error Mode	Do the following
One short beep	When any key is activated while on battery and Enable by Magnet™ is not active.	Locked mode	1.Enable EBM and retry 2.Return CUDM to LINAK for service
	Failure on system to power down	Power Down Error	
Three short beeps	Battery Capacity less than 25% when the wheel is raised	Low Battery	Warning signal for low battery: Connect to mains until fully charged
One long beep	If the Power Switch Error bit in the Error Register is set, one long beep sounds every time the user activates a direction key	Power Switch Error	Connect to mains, and disconnect. Try again. If problem persists, return CUDM to LINAK
Five long beeps	Temperature, FET exceeds FET Temperature Limit	FET Temperature Exceeded	Return item to LINAK
Three long beeps	The wheel connected input is short circuited	Wheel failure	1. Check all connections are in place 2. Exchange wheel cable and / or wheel 3. Exchange CUDM
	Wheel Up Switch failed to:	Wheel Up Switch failure	
Wheel goes down and immediately up again	The CUDM has detected low battery state	No further running allowed	Charge battery (Connect to mains)

Information regarding resetting the HBDM in case it is already configured to another CUDM.

1. S1 & S2, 10 seconds including mains on.
Hereafter mains off wait 5 seconds, mains on again 10 seconds; hereafter OK (this is called a power cycle.
2. S3 + S4, 10 sec. LED flashes, release button => HB + 2. uP er.

Reset of configuration, e.g. if HBDM has been exchanged:

a) Make sure the system is powered from mains.
b) Press and keep pressed both the Hare and the Turtle keys (S3 and S4) until all LEDs start flashing at a fast rate (will happen after 10 seconds).
c) Release the keys and the CUDM will reconfigure all system components.
d) When configuration is done, the LEDs will stop flashing and return to showing the level of battery charge.
e) Disconnect mains. System is ready for use.

5th Driving wheel - Control Unit

CUDM is the Control Unit for the Driving Wheel system. This is where communication between the battery, handset and wheel takes place.
The Control unit comprises of two channels for controlling motors. One channel (CH1) is dedicated to the Wheel Motor and the other (CH2) is dedicated to the Wheel Lowering Motor.

CUDM includes:

1 pcs. 0770021-A Microfit Blind Plug
2 pcs. 0770022-A Minifit Blind Plug
1 pcs. 0951027-A Retainer

Features and Options:

- Softstart and softstop: Yes
- Colour: Light grey RAL7035
- Plug type: OpenBus™ plug (Battery input ch.3, rotated 180º)
- Charging: via OpenBus™
- Power supply: BADM Battery box

Usage:

- Compatibility: CB20, CB16OBF, CB16OBL, CB6OBF and CB6OBM
- Duty cycle: Driving motor continuous
- Duty cycle: Wheel lowering motor 2/18; 2 minutes continuous use followed by 18 min. not in use
- Usage temperature: 5ºC to 40ºC
- Storage temperature: -10ºC to 50ºC
- Relative humidity: 20% to 80% at 30ºC
- Atmospheric pressure: 700 to 1060 hPa
- Approvals: Pending

Battery indicators:

Management of HBDM Battery Charge State LED's.
The HBDM battery charge state LED's are controlled as follows:

Battery percentage remaining	LED			Buzzer
	25 %	50 %	100 %	
0 - 10 %	Flashing fast	Off	Off	According to Table 2 (see later page) when the wheel is raised.
10 - 40 %	Lit	Off	Off	Silent
40 - 80 %	Lit	Lit	Off	Silent
80 - 100 %	Lit	Lit	Lit	Silent

Charging:
This is valid when charging (mains) or while being activated. If disconnected from mains and no activation all LED's are off.

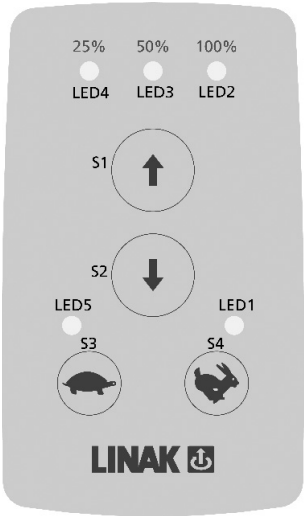
Speed LEDs
When the 5th Driving wheel system is powered from battery, the HBDM speed LEDs show the selected speed.

Configuration:
All software for the entire system is Quality Test released. There will not be a Software task. However there might be a configuration task, depending on the existing system software.

In case of a configuration, a template must be filled out and added to '*Further Specification*' in the '*System Specification*' for the CUDM. The Template can be found on LINTRA.

If the addresses shown in the following are already in use in the existing system (software), where 5th Driving Wheel is to be used, then a configuration is necessary. In this case the CUDM must be created as a special item.

If OpenBus™ addresses can be used as shown in the following explanation, no further software/configuration is necessary.



Standard Configuration:
These addresses must be checked to see if they are used by an existing system. Check the CU/CB software specification. If these addresses are in use, a new configuration must be described.

S1 is defined as driving forward direction. Standard address is H22

S2 is defined as driving backwards. Standard address is H23

S3, Turtle is defined as driving slowly. Standard address is H24

S4, Rabbit is defined as driving fast. Standard address is H25

5th Driving wheel - Battery

The battery supplies power to the CUDM. The battery charge state is monitored in the CUDM and is displayed in the handset (HBDM).

Features and Options:

- Battery capacity: 2.9 Ah
- Input voltage: 24 V
- Capacity monitoring: via handset or Service data
- Colour: Light grey RAL7035
- Plug type: Mini-fit (turned 80°)
- Charging: via CUDM
- Power supply: no external power supply available
- IP rating: IPx6

Usage:

- Compatibility: CUDM only
- Duty cycle: Continuous use
- Usage temperature: 5°C to 40°C
- Relative humidity: 205 to 80% at 30°C
- Storage temperature: -10°C to 50°C
- Atmospheric pressure: 700 to 1060 hPa
- Approvals: Pending
- Internal fuse: 10A

Charging time via an MJB (CB6OBM/CB6OBF) > 25 hours
Charging time via CB16 / CB20 approx. 8 hours
Only to be charged via CUDM

5th Driving wheel - Control handset

The handset is specially designed for control of the 5th Driving wheel. It is an intuitive handset which is easy to use, the handset has arrow heads for moving forward or backwards.
To control the speed of the 5th Drive wheel it is only necessary to press one button. If the "***rabbit***" button is pressed the system will go into fast mode, if the "***turtle***" button is pressed the system will drive at a lower speed, which is suitable for maneuvering the bed in small places or around sharp and difficult corners.

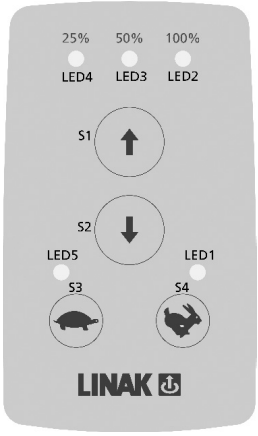
Features and Options:

- max. 4 buttons
- max. 5 LED's
- Customised design possible
- Colour light grey RAL7035
- Integrated cable with OpenBus™ plug
- IP rating IPx6

Usage:

- Compatibility: CUDM 5. Drive wheel system
- Duty cycle: Continuous use
- Usage temperature: 5ºC to 40ºC
- Relative humidity: 205 to 80% at 30ºC
- Storage temperature: -10ºC to 50ºC
- Atmospheric pressure: 700 to 1060 hPa
- Approvals: Pending

Functional description
The operating surface consists of 4 keys, 5 LED's and a hidden magnet activation key.



Keys:
Arrow pointing upwards: Drive forward
Arrow pointing downwards: Drive backwards
Hare: Fast speed
Tortoise: Low speed

Magnet activation:
Must be activated in order to use the system

LED's:
25%, 50%, 100%: Indicates battery capacity
Hare: LED lit when fast speed chosen
Tortoise: LED lit when slow speed chosen

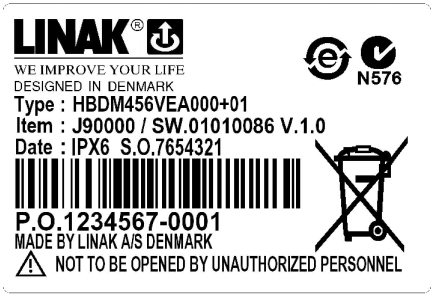
Key to symbols

The following symbols are used on the label on the LINAK products.

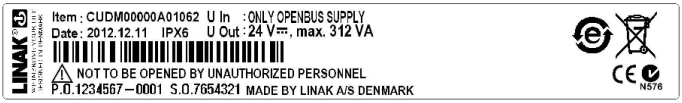
Ⓓ	Demko approval
FI	Fimko approval
F	
P	
APPROVAL V94265	Australian approval mark
APPROVAL NO.:97122	Australian approval mark
	Recognised - Component Mark
c	Canadian Recognised - Component Mark
c US	Recognised Component Mark for Canada and the United States
	T-Mark
RWTÜV GEPRÜFT	RW-Tüv approval
TÜV Rheinland Gruppe BAUART GEPRÜFT TYPE APPROVED	Tüv.Produkt Service
TÜV Rheinland Product Safety GS	TÜVRheinland
UL DE GS	
TÜV PRODUCT SERVICE Bauart geprüft	
ETL	ETL
ETL LISTED C ETL US	C-ETL
CS95145V	
LGA	LGA

File E97199	UL file number
File E175209	UL file number
File E151104	UL file number
CSA	CSA
P S E	PSE-Mark
	Product with a thermofuse
	For indoor use (House).
	Safety isolating transformer.
	Electronics scrap
	Equipment Kl.2 (Double square)
	Patient part of type B (Mand)
	Patient part of type BF
	Earth protection
KL.1	Equipment class1.
	Earth
CE	CE Mark
	C-TICK

Labels for 5th Driving wheel

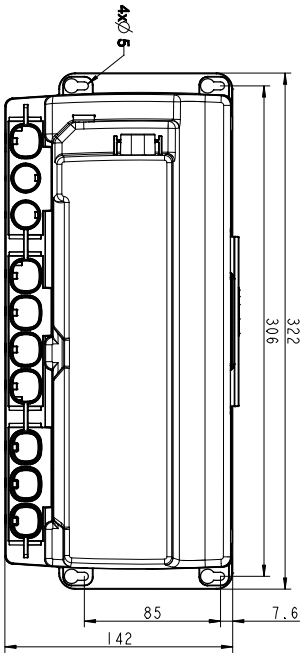


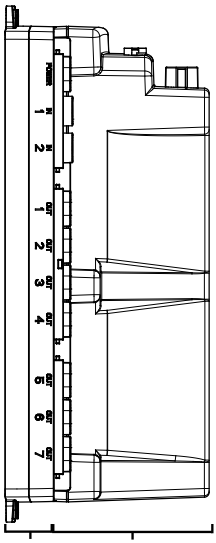
Item : BADM16-0100-000
Date : 2012.12.11 IPX6 U Out : 24 V⎓ I Out : 16 Amp
NOT TO BE OPENED BY UNAUTHORIZED PERSONNEL
P.O.1234567–0001 S.O.7654321 MADE BY LINAK A/S DENMARK
CE N576

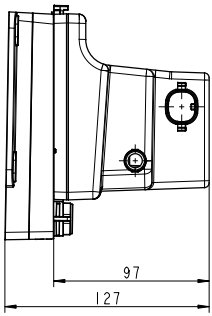

Item : CUDM00000A01062 U In : ONLY OPENBUS SUPPLY
Date : 2012.12.11 IPX6 U Out : 24 V⎓, max. 312 VA
NOT TO BE OPENED BY UNAUTHORIZED PERSONNEL
P.O.1234567–0001 S.O.7654321 MADE BY LINAK A/S DENMARK
CE N576

DRAWING APPENDIX

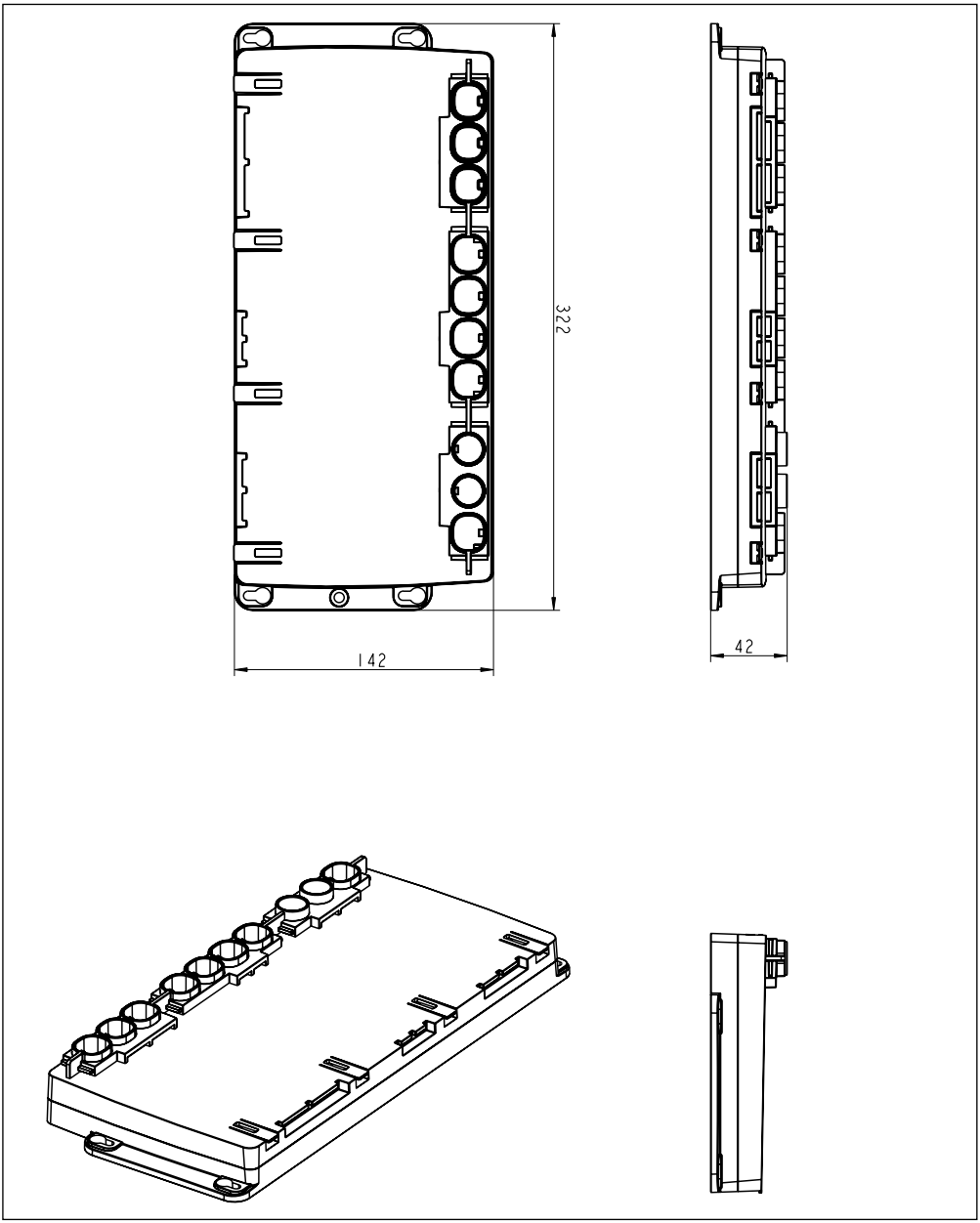
5th Driving wheel



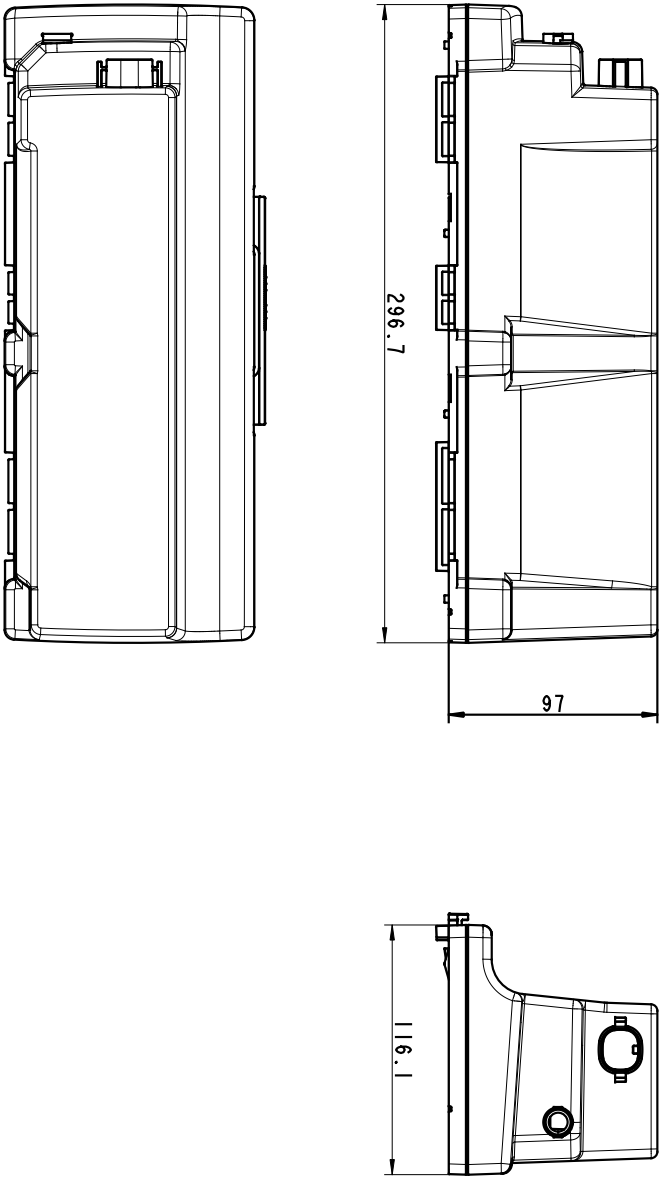




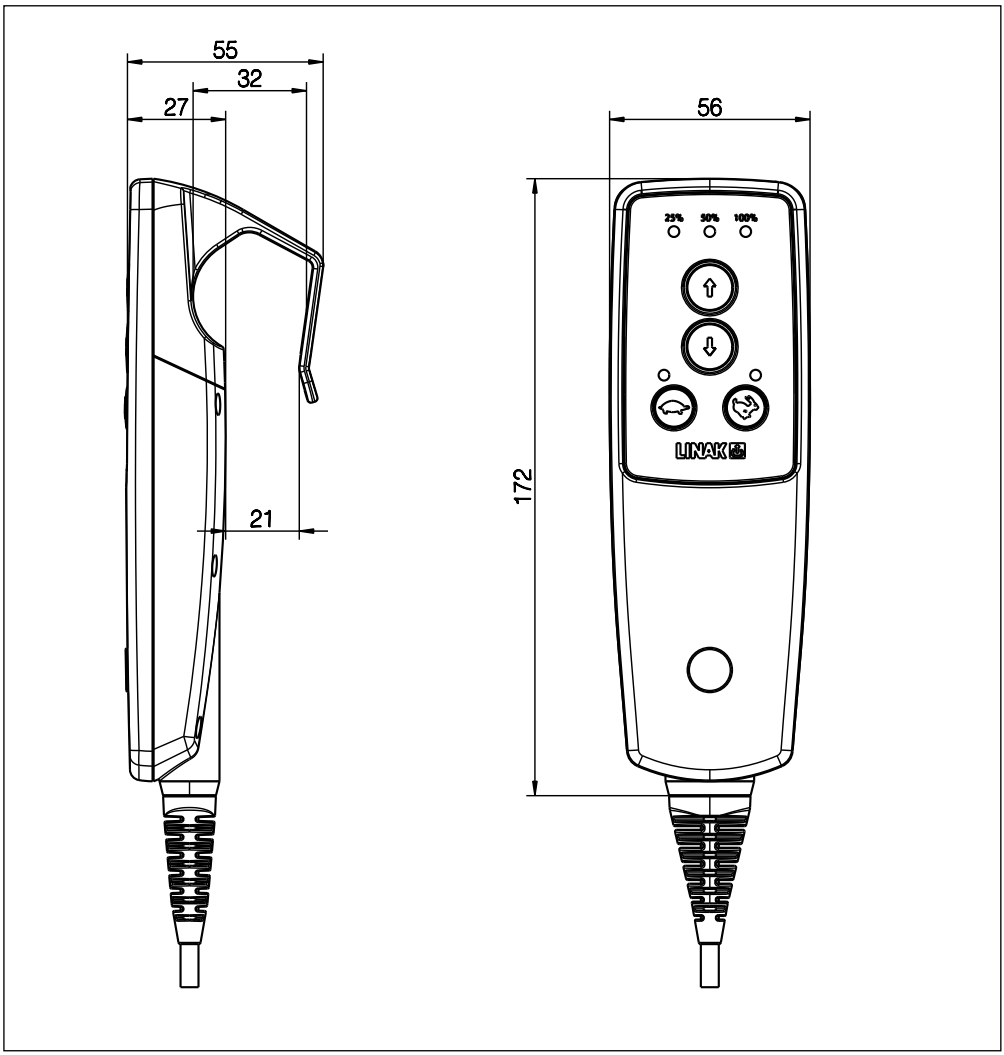
5th Driving wheel - Control Unit



5th Driving wheel - Battery



5th Driving wheel - Control handset



LINAK APPLICATION POLICY

The purpose of the application policy is to define areas of responsibilities in relation to applying a LINAK product defined as hardware, software, technical advice, etc. related to an existing or new customer application.

LINAK products as defined above are applicable for a wide range of applications within the Care and Health, Comfort furniture, Desk and Industry areas. Yet, LINAK cannot know all the conditions under which LINAK products will be installed, used, and operated, as each individual application is unique.

The suitability and functionality of the LINAK product and its performance under varying conditions (application, vibration, load, humidity, temperature, frequency, etc.) can only be verified by testing, and shall ultimately be the responsibility of the LINAK customer using any LINAK product.

It is also the responsibility of the LINAK customer to make and supply a comprehensive user manual of the application.

LINAK shall be responsible solely that the LINAK products comply with the specifications set out by LINAK and it shall be the responsibility of the LINAK customer to ensure that the specific LINAK product can be used for the application in question.

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